

## **METHOD OF PROVIDING A FILE TRANSFER SERVICE THROUGH A MOBILE COMMUNICATION NETWORK**

### BACKGROUND OF THE INVENTION

#### **1. Field of the Invention**

5 The present invention relates to a method of providing a file transfer service through a mobile communication network, more particularly, to a method of determining whether to transfer a data file including audio, moving-picture, or text contents, requested to be transferred through a mobile station, based on specified 10 transfer condition and/or file size, and transferring a data file to a destination mobile terminal connected through a mobile communication network.

#### **2. Description of the Related Art**

In general, a telephone is a very popular communication tool, 15 which enables voice communication between two speaking parties, and it is classified into two types, one is a wired telephone for a public switched telephone network (PSTN) and the other is a mobile station

for a wireless communication network. A mobile station provides a person with mobility which ensures data/voice communication anywhere.

Lately, a next-generation mobile communication network is being introduced according to remarkable development of mobile communication technology. The next-generation mobile communication network such as IMT-2000 (International Mobile Telecommunication for the 2000s) or FPLMTS (Future Public Land Mobile Telecommunication System) is expected to be commercialized sooner or later. The next-generation mobile communication network adopts a packet switched method for sending/receiving audio, moving-picture, or data file at high speed, and it also uses high frequency band, e.g., 1,885MHz~2,110MHz or 2,110MHz~2,200MHz to ensure higher data transmission rate.

Therefore, the next-generation mobile communication network can provide high-quality communication service, namely, high-speed data transmission and highly-reliable data delivery for video or text data file as well as conventional voice conversation, furthermore, it can provide various supplementary services.

However, a mobile station has too small storage capacity to store large-sized data file when it receives or sends, and service charge of wireless data communication is relatively higher than that of wired communication as well, so that service use cost would be increased greatly if a lot of data are transferred through a mobile communication network.

through a mobile communication network, which transfers a data file to a terminal other than a target mobile station based on file size and/or file type, and guarantees data file transfer to be conducted out of a time zone of high service charge where the time zone is set 5 by a user.

A method of providing a file transfer service through a mobile communication network according to the present invention, stores a data file and transfer conditioning information thereof received from a first mobile terminal connected through the mobile communication 10 network, transmits information for transferring the data file through the mobile communication network based on the stored transfer conditioning information, and transfers the data file to a second mobile terminal answering to said information for transferring the data file if response information from the second mobile terminal 15 is matched with the transfer conditioning information.

Another method of providing a file transfer service through a mobile communication network according to the present invention, stores a data file and transfer blocking time zone information thereof received from a first mobile terminal connected through the mobile 20 communication network, selects one among the stored data files based on the stored transfer blocking time zone information, and transfers the selected data file to a second mobile terminal specified as destination of the selected file avoiding the corresponding transfer blocking time zone.

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further understanding of the invention, illustrate the preferred embodiments of the invention, and together with the description, serve to explain the principles of the present invention.

In the drawings:

5 Fig. 1 is an illustrative network to which a file transferring method according to the present invention is applied;

Fig. 2 shows an example of transfer conditioning information stored in a file handling server according to the present invention;

10 Fig. 3 shows an example of a calling signal carried through a paging channel of a wireless signal;

Fig. 4 is an illustrative LCD screen showing that a file transfer is ready;

Fig. 5 shows a mobile station connected to a personal computer to receive a large-sized data file;

15 Fig. 6 shows an example of an answering signal carried through an accessing channel of a wireless signal; and

Fig. 7 is an illustrative LCD screen showing that a data file is being received according to the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

20 In order that the invention may be fully understood, a preferred embodiment thereof will now be described with reference to the accompanying drawings.

Fig. 1 is an illustrative network to which a file transferring method according to the present invention is applied. The illustrative network of Fig. 1 comprises a plurality of mobile stations (MSSs) 10, 11, 12,...; a file handling server 20 for storing both data files to

be communicated with the plurality of the MSs and all transfer conditioning information thereof; a call charging server 21 for charging for file transfer and voice conversation and storing charge information; and an authorizing server 22 for authorizing a subscriber 5 with pre-stored subscriber authentication information.

Fig. 2 shows an example of the transfer conditioning information to be stored in the file handling server 20 according to the present invention. The transfer conditioning information includes a code number of an audio, video, or text file specified to be transferred 10 by a subscriber; terminal identification number (TIN), e.g., ESN (Electronic Serial Number) or telephone number of an originating MS initiating a file transfer service; TIN of a destined MS to receive a data file; file transfer blocking time zone set by a subscriber; and file type and size. The file transfer blocking time zone is 15 preferably set by a subscriber to time zone when traffic is thought to be much congested or charge per unit time is relatively high.

If a subscriber carrying a MS 10 wants to transfer a certain audio, video or text file to a target MS 11, he or she tries to make connection to the file handling server 20 through a mobile 20 communication network 100 with his or her MS 10, first. Then, he or she selects a desired file stored in the file handling server 20 or uploads a data file to transfer to the file handling server 20 through the MS 10.

After that, a TIN of the destination MS 11 and the file transfer 25 blocking time zone are uploaded or entered from the originating MS 10, and are stored in the file handling server 20. A TIN of the originating MS 10 may be automatically provided for the file handling

server 20 from the mobile communication network if not provided from the MS 10, and a telephone number, if provided instead of ESN, can be replaced to corresponding ESN.

The file handling server 20 will charge differently for each 5 data file transfer service according to the set file transfer blocking time zone, therefore, a subscriber can reduce data transfer service using cost by setting the file transfer blocking time zone to heavy traffic time zone which usually has high-rate charging scheme.

The file handling server 20 stores, as shown in Fig. 2, the 10 information, received from input and selection through the originating MS 10, as the transfer conditioning information which is used to determine transfer of a file. The file handling server 20 examines all stored file transfer blocking time zones included in the transfer conditioning information to determine which file is 15 to be transferred earliest of all.

Namely, the file handling server 20 searches the stored file transfer blocking time zones set by many subscribers for one time zone which is closest to a current time. If one is selected, the file handling server 20 reads TIN stored in connection with the selected 20 time zone, and tries to make connection to the MS 11 the read TIN addresses. To make connection, a calling signal is carried by a paging channel with a TIN of the called MS 11 and information on a file to transfer as shown in Fig. 3 where the file information includes file type and size.

25 Accordingly, the called MS 11 identifies its own TIN carried in the paging channel, then it extracts the file information in the paging channel and displays 'file transfer ready' on its LCD as shown

in Fig. 4 together with file type (or attribute) and size contained in the extracted file information. A person carrying the called MS 11, therefore, knows with ease that a data file is to be downloaded to him or her now.

5 The person having acknowledged 'file transfer ready' will select 'start file transfer' or 'suspend file transfer' based on the file type and/or size displayed on the LCD of the MS 11. Namely, if the file to be downloaded is small-sized audio or text one, the called person is likely to select 'start file transfer' to request immediate 10 file download, however if the file is large-sized moving-picture one, he or she will select 'suspend file transfer' to put file download on hold.

In the condition that file transfer is suspended, if a large-storage peripheral device such as a personal computer is 15 connected to the called MS 11 as shown in Fig. 5, the called MS 11 sends its own TIN, terminal status of the connected device, and a download accepting signal through an accessing channel of wireless signals after receiving the terminal status. The terminal status contains information on spare storage capacity of the connected device 20 and it is entered by the called person or is provided automatically from the peripheral device as soon as the called MS 11 is connected to the device.

Then, the file handling server 20 receives all the information sent from the called MS 11 through the mobile communication network 25 100, identifies, based on TIN contained in the received information, which file the received information is about, and checks the type and size of the identified file to know whether the spare storage

capacity of the connected peripheral device is sufficient for the file to transfer. If the spare storage capacity is not enough to store the file, the file handling server 20 sends a message notifying of possible download fail, otherwise, it immediately starts download 5 of the file and, at the same time, sends a message indicative of 'download being processed' which will be displayed on an LCD of the called MS 11 like as in Fig. 7.

When the data file is downloaded, the called MS 11 stores it in an internal memory or delivers it to the connected external device 10 to store it in a large-capacity storage medium of the external device, based on size of the received data file. After the file download is done, the file handling server 20 sends to the originating MS 10 a message advising that the requested file transfer has been accomplished. This message is also displayed on an LCD of the 15 originating MS 10.

In addition, the file handling server 20 provides necessary information for charging for the file transfer for the call charging server 21 which charges for the file transfer based time difference between corresponding file transfer blocking time zone and actual 20 file transferred time which are contained in the necessary information provided from the file handling server 20.

In other words, the call charging server 21 charges for the file transfer in reverse proportion to the time difference. Namely, if the time difference is large the file transfer service is charged 25 low as much. Therefore, the service charge for file transfers accomplished at same time would be different if corresponding file transfer blocking time zones are not equal.

If call connection to the target MS 11 is failed due to power-off of the MS 11 or pre-occupancy of all links of a cell where the MS 11 is located, the file handling server 20 searches for next file transfer blocking time zone which is secondly closest to the current 5 time, and reads TIN stored in connection with the found time zone, and tries to make connection to a certain MS the read TIN addresses. If connection is made to the MS, the above-explained file transfer service is conducted.

In the meantime, when a file transfer is requested to the file 10 handling server 20 from the originating MS 10, the file handling server 20 may send a subscriber authentication requesting signal to the authorizing server 22 together with TIN of the MS 10. Then, the authorizing server 22 acknowledging the requesting signal from the file handling server 20 sends to the originating MS 10 a message 15 requesting unique subscriber's number and password which is displayed on an LCD of the MS 10. After that, if subscriber's number and password are received the authorizing server 22 determines based on validity of them whether or not a person carrying the MS 10 is entitled to use file transfer service.

20 If authentication of a person who owns the called MS 11 is required too, the file handling server 20 also transmits a subscriber authentication requesting signal to the authorizing server 22 together with TIN of the called MS 11. Then, the authorizing server 22 sends to the destination MS 11 a message requesting unique 25 subscriber's number and password which is displayed on an LCD of the MS 11. After that, if subscriber's number and password are received the authorizing server 22 determines based on validity of them whether

or not a person carrying the MS 11 is entitled to receive a file to be downloaded by a file transfer service. If he or she is entitled to, the file handling server 20 starts to download a data file selected or uploaded from the originating MS 10.

5 The file handling server 20 may be integrated into a mobile switching center (MSC) conducting call processing and data switching operation instead of a separate single system which is connected to MSCs to provide additional file transfer service as explained above.

10 The method of providing a file transfer service through a mobile communication network according to the present invention, enables a subscriber to transfer a data file to a mobile terminal located anywhere through a mobile communication network avoiding highly-charging time zone, and also prevents in advance file transfer fail which might be caused from insufficient storage capacity of a 15 receiving mobile terminal for a large-sized data file to transfer.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being 20 indicated by the appended claims rather than by the foregoing description and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.